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10/586,244	05/16/2007	**Jana Zaumseil**	Q96030	1821

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EXAMINER
SUCH, MATTHEW W

ART UNIT	PAPER NUMBER
2891	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/586,244	ZAUMSEIL ET AL.	
	Examiner	Art Unit	
	MATTHEW W. SUCH	2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 May 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27,29-33,35 and 37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27,29-33,35 and 37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 37 is objected to because of the following informalities: the phrase "the semiconductive layer" in Line 3 should read "the organic semiconductive layer". Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 29-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. These claims each set forth a method of forming the device of claim 1, and set forth steps for making an electron-injecting and hole-injecting electrode. However, the manner in which claim 1 is written fails to set forth that the device actually comprises an electron-injecting electrode or a hole-injecting electrode. Instead claim 1 merely notes that the device (which comprises the organic semiconductive layer and the organic gate dielectric layer) emits light when biased between (i.e. when used with) an electron-injecting and hole-injecting electrode. Claims 29-33 are drawn to making the device of claim 1, but only set forth method steps drawn to making elements that are not part of the device of claim 1. Instead, the steps set forth in claims 29-33 are drawn to making things (the electron-injecting and hole-injecting

electrodes) with which the device of claim 1 is intended to be used with. As such, since the methods of claims 29-33 do not actually set forth any method steps for elements that comprise the device of claim 1, these claims do not form the device of claim 1 and the steps provided therein are indefinite.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 22 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Hayashi (`280) in view of Ruzyllo (Semiconductor Glossary; provided as evidence of "transistor").

a. Regarding claim 22, Hayashi teaches an ambipolar (see Figures and Para. 0113 teaching that the charge carriers include both holes and electrons) light-emitting transistor including an organic semiconductive layer (Element 1; Para. 0113-0134 all describe this organic semiconductive layer).

Regarding the recitation of "in contact with an electron injection electrode and a hole injection electrode", the examiner notes that this language fails to actually recite that

the claimed device actually comprises an electron injection electrode and a hole injection electrode. If the Applicant wishes to properly claim that the electron injection electrode and the hole injection electrode are actually part of the claimed device, the examiner suggests language such as "An ambipolar, light-emitting transistor comprising an organic semiconductive layer, an electron injecting electrode, and a hole-injecting electrode; wherein the organic semiconductive layer contacts the electron injecting electrode and the hole injecting electrode…". As currently written however, the claim language merely states what things the ambipolar light-emitting transistor (which comprises only the organic semiconductive layer) is contacting. Specifically, that the organic semiconductor (which completes what comprises the device claimed) is "in contact with" the electron injecting and hole injecting electrodes that are separated by a distance L and that light emission from the organic semiconductor layer is located more than L/10 away from these electrodes. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2114. Nevertheless, for the purposes of compact prosecution, Hayashi teaches that the organic semiconductive layer is in contact with an electron injection electrode (cathode, see Element 3) and a hole injection electrode (anode, see Element 5). These electrodes are at some arbitrary distance, L. Further, since light

emission is shown to occur in the entirety of the organic semiconductor layer that is positioned between the electron injecting and hole injecting electrodes, then light emission is occurring across the entire distance of L, including at a distance of L/10.

The examiner notes that the device of Hayashi is a transistor because it has two electrodes (Elements 3, 3a and 5, 5a) between which current flows, also has a third electrode (Element 4, 4a which controls the level of current that flows between Elements 3, 3a and 5, 5a by applying a voltage to the third electrode which is isolated from the organic semiconductor layer by the insulation layer of Element 2; see Para. 0020-0022; Para. 0063, Lines 13-19; Para. 0076). Ruzyllo evidences that such configurations are transistors since a transistor is a "three-terminal semiconductor device in which input signal (voltage or current depending on the type of transistor) controls output current" (see Page 163, entry for "transistor").

b. Regarding claim 37, Hayashi teaches an ambipolar (see Figures and Para. 0113 teaching that the charge carriers include both holes and electrons) light-emitting transistor including an organic semiconductive layer (Element 1; Para. 0113-0134 all describe this organic semiconductive layer).

Regarding the recitation of "between an electron injection electrode and a hole injection electrode", the examiner notes that this language fails to actually recite that the claimed device actually comprises an electron injection electrode and a hole injection electrode. If the Applicant wishes to properly claim that the electron injection electrode and the hole injection electrode are actually part of the claimed device, the examiner

suggests language such as "An ambipolar, light-emitting transistor comprising an organic semiconductive layer, an electron injecting electrode, and a hole-injecting electrode; wherein the organic semiconductive layer is between the electron injecting electrode and the hole injecting electrode…". As currently written however, the claim language merely states what things the ambipolar light-emitting transistor (which comprises only the organic semiconductive layer) is placed between. Specifically, that the organic semiconductor (which completes what comprises the device claimed) is "between" the electron injecting and hole injecting electrodes. Furthermore, the language of "which ambipolar light-emitting transistor emits light from the [organic] semiconductive layer when operated in a biasing regime in which negative electrons are injected from the electron injecting electrode into the organic semiconductive layer and positive holes are injected from the hole injecting electrode into the organic semiconductive layer" merely describes what the ambipolar light-emitting transistor (which comprises only the organic semiconductive layer) does. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2114. Nevertheless, for the purposes of compact prosecution, Hayashi teaches that the organic semiconductive layer is between an electron injection electrode (cathode, see Element 3) and a hole injection electrode

(anode, see Element 5). The device of Hayashi emits light when operated in a biasing regime in which negative electrons are injected from an electron-injecting electrode into the organic semiconductive layer, and positive holes are injected from a hole-injecting electrode into the organic semiconductive layer (this functionality is described in abundance in the prior art, see Para. 0015-0019, 0062-0063, 0075-0076, at least).

The examiner notes that the device of Hayashi is a transistor because it has two electrodes (Elements 3, 3a and 5, 5a) between which current flows, also has a third electrode (Element 4, 4a which controls the level of current that flows between Elements 3, 3a and 5, 5a by applying a voltage to the third electrode which is isolated from the organic semiconductor layer by the insulation layer of Element 2; see Para. 0020-0022; Para. 0063, Lines 13-19; Para. 0076). Ruzyllo evidences that such configurations are transistors since a transistor is a "three-terminal semiconductor device in which input signal (voltage or current depending on the type of transistor) controls output current" (see Page 163, entry for "transistor").

6. Claim 37 is rejected under 35 U.S.C. 102(e) as being anticipated by Heeger (`583).

Heeger teaches an ambipolar (see Fig.1 and associated text, for example, showing that the charge carriers include both holes and electrons) light-emitting transistor (see Col. 2, Lines 35-36, which use the word "transistor") including an organic semiconductive layer (Element "polymer" and "polymer LEC" and associated text describing the organic semiconductive layer).

Regarding the recitation of "between an electron injection electrode and a hole injection electrode", the examiner notes that this language fails to actually recite that the claimed device

actually comprises an electron injection electrode and a hole injection electrode. If the Applicant wishes to properly claim that the electron injection electrode and the hole injection electrode are actually part of the claimed device, the examiner suggests language such as "An ambipolar, light-emitting transistor comprising an organic semiconductive layer, an electron injecting electrode, and a hole-injecting electrode; wherein the organic semiconductive layer is between the electron injecting electrode and the hole injecting electrode…". As currently written however, the claim language merely states what things the ambipolar light-emitting transistor (which comprises only the organic semiconductive layer) is placed between. Specifically, that the organic semiconductor (which completes what comprises the device claimed) is "between" the electron injecting and hole injecting electrodes. Furthermore, the language of "which ambipolar light-emitting transistor emits light from the [organic] semiconductive layer when operated in a biasing regime in which negative electrons are injected from the electron injecting electrode into the organic semiconductive layer and positive holes are injected from the hole injecting electrode into the organic semiconductive layer" merely describes what the ambipolar light-emitting transistor (which comprises only the organic semiconductive layer) does. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2114. Nevertheless, for the purposes of compact prosecution, Heeger teaches that the organic semiconductive layer is

between an electron injection electrode (in this case "source", see Figs. 1a, 1b and 2) and a hole injection electrode (in this case "drain", see Figs. 1a, 1b and 2). The device of Heeger emits light when operated in a biasing regime in which negative electrons are injected from an electron-injecting electrode into the organic semiconductive layer, and positive holes are injected from a hole-injecting electrode into the organic semiconductive layer (this functionality is described in abundance in the Heeger, see Col. 4, lines 25-35, at least).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi (`280) in view of Ruzyllo (Semiconductor Glossary; provided as evidence of "transistor").

Hayashi teaches an ambipolar (see Figures and Para. 0113 teaching that the charge carriers include both holes and electrons) light-emitting transistor including an organic semiconductive layer (Element 1; Para. 0113-0134 all describe this organic semiconductive layer).

Regarding the recitation of "in contact with an electron injection electrode and a hole injection electrode", the examiner notes that this language fails to actually recite that the claimed device actually comprises an electron injection electrode and a hole injection electrode. If the

Applicant wishes to properly claim that the electron injection electrode and the hole injection electrode are actually part of the claimed device, the examiner suggests language such as "An ambipolar, light-emitting transistor comprising an organic semiconductive layer, an electron injecting electrode, and a hole-injecting electrode; wherein the organic semiconductive layer contacts the electron injecting electrode and the hole injecting electrode…". As currently written however, the claim language merely states what things the ambipolar light-emitting transistor (which comprises only the organic semiconductive layer) is contacting. Specifically, that the organic semiconductor (which completes what comprises the device claimed) is "in contact with" the electron injecting and hole injecting electrodes and that light emission from the organic semiconductor layer is located more than 1 micron (or 5 microns) away from these electrodes. The Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2114. Nevertheless, for the purposes of compact prosecution, Hayashi teaches that the organic semiconductive layer is in contact with an electron injection electrode (cathode, see Element 3) and a hole injection electrode (anode, see Element 5). These electrodes are at some arbitrary distance. Further, since light emission is shown to occur in the entirety of the organic semiconductor layer that is positioned between the electron injecting and hole injecting electrodes, then light emission is occurring across the entire distance between the electrodes. Again, as already noted above, the

recitation of "from which the light is emitted is located more than 1 (or 5) micron(s) away from both the electron as well as the hole injecting electrode", the claims fail to actually recite that this zone and the hole injecting electrode and electron injecting electrode are part of the scope of the claimed device. However, even if it was (and for the purposes of compact prosecution), although Hayashi does not explicitly teach this detail, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the light emission zone to be more than 5 microns away from the source and drain electrodes in order to produce a device that is large enough for the light to visible to the unaided eye, such as for a pixel application. Additionally, such detail merely requires a change in size. Furthermore, the examiner takes the position that the choice of thickness ranges of the insulation film is not critical to the invention; therefore, the range is a matter of choice. Furthermore, Hayashi discloses the claimed invention except for teaching that the distance between the source and drain electrodes (electron injecting and hole injecting electrodes, respectively). It would have been an obvious matter of design choice to make the thickness of the insulation film greater than the film thickness of the gate insulator, since such a modification would have involved a mere change in the size of a component and it has been held that a mere change in size is recognized as being within the level of ordinary skill in the art. *In* re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955). *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976). See MPEP § 2144.04 IV A.

The examiner notes that the device of Hayashi is a transistor because it has two electrodes (Elements 3, 3a and 5, 5a) between which current flows, also has a third electrode (Element 4, 4a which controls the level of current that flows between Elements 3, 3a and 5, 5a by applying a voltage to the third electrode which is isolated from the organic semiconductor layer

by the insulation layer of Element 2; see Para. 0020-0022; Para. 0063, Lines 13-19; Para. 0076). Ruzyllo evidences that such configurations are transistors since a transistor is a "three-terminal semiconductor device in which input signal (voltage or current depending on the type of transistor) controls output current" (see Page 163, entry for "transistor").

9. Claims 1-21, 25-27, 29-33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi (`280) in view of Kelley (`472) in view of Ruzyllo (Semiconductor Glossary; provided as evidence of "transistor").

c. Regarding claims 1 and 25, Hayashi teaches a light-emitting field-effect transistor including an organic semiconductor layer (Element 1; Para. 0113-0134 all describe this organic semiconductive layer) having an electron affinity $EA_{semicond}$. The examiner notes that the recitation of "having an electron affinity $EA_{semicond}$" merely points out that the organic semiconductive layer has an electron affinity, which they do, and does not limit what the electron affinity is. The device comprises an organic gate dielectric layer (Element 2; Para. 0139-0140 teaches the organic gate dielectric layer) such as a non-conductive polymeric material that is spin-coated during fabrication of the device (see Para. 0139-0140). Regarding the recitation of "characterized in that", the examiner notes that such language does not limit what the organic gate dielectric layer actually comprises, but merely states how it is characterized (nevertheless, for the purposes of compact prosecution, the examiner provide prior art with an organic gate dielectric layer having these properties as shown).

While Hayashi teaches that the organic gate dielectric layer is an organic material that is interfaced with the organic semiconductor material, formable by a spin coating process (see Para. 0140) there is no explicit teaching of the material, since such detail is conventional the art.

However, Kelley teaches using polysiloxanes, such as poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane) (see Para. 0038) as an organic gate insulating material that interfaces with an organic semiconductor. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane) as taught by Kelley as the organic gate insulating material of Hayashi. One would have been motivated to do so since Kelley teaches that these materials provide the benefit of improving organic transistor performance, such as reducing the threshold voltage and increasing carrier mobility (see Table 2, for example). Additionally, these materials are able to formed by spin coating (see Kelley Para. 0044), which is also a desired trait from Hayashi. Regarding the recitation of "characterised in that the bulk concentration of trapping groups in the gate dielectric layer is less than $10^{18}cm^{-3}$, where a trapping group is a group having (i) an electron affinity EA_x greater than or equal to $EA_{semicond}$ and/or (ii) a reactive electron affinity EA_{rxn} greater than or equal to $EA_{semicond.}$-2eV", the examiner notes that the poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane) of Hayashi in view of Kelley meet this language because these electron affinity requirements are merely material properties and meeting recitation (i) and/or (ii) is merely a consequence of material selection. As noted by Applicant's specification at

Page 28, the poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane) materials have the material properties which satisfy the claim.

The examiner notes that the device of Hayashi is a transistor because it has two electrodes (Elements 3, 3a and 5, 5a) between which current flows, also has a third electrode (Element 4, 4a which controls the level of current that flows between Elements 3, 3a and 5, 5a by applying a voltage to the third electrode which is isolated from the organic semiconductor layer by the insulation layer of Element 2; see Para. 0020-0022; Para. 0063, Lines 13-19; Para. 0076). Ruzyllo evidences that such configurations are transistors since a transistor is a "three-terminal semiconductor device in which input signal (voltage or current depending on the type of transistor) controls output current" (see Page 163, entry for "transistor").

It is further noted that the manner in which the claim is written comprises the elements of the organic semiconductive layer and the organic gate dielectric layer limited by the properties set forth for these elements. As such, these are the structural features that need to be shown in the prior art in order to meet the structural requirements of the claim (which the prior art does, as shown herein). The functional descriptions of what the device does not distinguish this device over the prior art because (1) the prior art teaches the claimed structural elements (as already shown) and (2) the prior art functions in a manner that is identical to the Applicant's claimed invention. Specifically, the language of "that emits light when operated in a biasing regime in which negative electrons are injected from an electron-injecting electrode into the organic semiconductive layer, and positive holes are injected from a hole-injecting electrode into

the organic semiconductive layer", does not distinguish the claim from the structural limitations of the prior art. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). See MPEP § 2112.01. For example, the device of Hayashi emits light when operated in a biasing regime in which negative electrons are injected from an electron-injecting electrode into the organic semiconductive layer, and positive holes are injected from a hole-injecting electrode into the organic semiconductive layer (this functionality is described in abundance in the prior art, see Para. 0015-0019, 0062-0063, 0075-0076, at least).

d. Regarding claim 2, the transistor is an ambipolar transistor (see Figures and Para. 0113 teaching that the charge carriers include both holes and electrons).

e. Regarding claims 3-4, electron affinity is a material property and Hayashi teaches that the organic semiconductor is Alq3, which has an electron affinity of 2.7 eV.

f. Regarding claims 5-12, the poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane) insulating polymer materials of Hayashi in view of Kelley meet each of these claims for the reasons shown above in claim 1. Specifically, for claim 5, there are no trapping groups in these materials (as evidenced by the Applicant's specification for these materials). For claim 6, there is no group of (i) or (ii) set forth (as evidenced by

Applicant's specification for these materials). For claim 7, poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane) does not contain any of a quinine, Ar-OH, R-COOH, Ar-SH, or Ar-COOH. For claim 8, poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane) contains a siloxane. For claim 9, poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane) are insulating polymers. For claim 10, poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane are poly(siloxanes). For claim 11, poly(dimethylsiloxane) and poly(dimethylsiloxane-co-diphenylsiloxane have a backbone with a repeat unit comrpising $-Si(R)_2-O-Si(R)_2-$ with R being methyl or phenyl. For claim 12, the materials of Hayashi in view of Kelley can be crosslinked (see Kelley Para. 0048).

g. Regarding claim 13, Hayashi teaches that the organic semiconductor material can comprise a semiconductive polymer, such as polythiophene (see Para. 0131).

h. Regarding claim 14, Hayashi teaches that the organic semiconductor material can comprise a semiconductive oligomer, such as anthracene (see Para. 0117).

i. Regarding claim 15, Hayashi teaches that the organic semiconductive material can comprise an organic small molecule, such as Alq3 (see Para. 0119).

j. Regarding claims 16-21, the manner in which these claims are written do not further limit the scope of the claimed structure of the device because claim 1 fails to

recite that the claimed structure ***comprises*** the electron injecting electrode and hole injecting electrode. As such, these claims merely recite more detail concerning elements with which the claimed device is used. See discussion in claim 1 above. Again, the Examiner notes that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See, e.g., *In re Pearson*, 181 USPQ 641 (CCPA); *In re Minks*, 169 USPQ 120 (Bd Appeals); *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). See MPEP §2114. Nevertheless, Hayashi envisages an electron injecting electrode cathode and hole injecting electrode anode which can be the same material or different (see Para. 0104) in contact with the organic semiconductor layer (see Figures).

k. Regarding claims 26 and 27, Hayashi teaches applying a bias voltage to a control gate electrode (see Para. 0061). A bias voltage is also applied to a hole injecting electrode (anode Element 5; see Para. 0061) and an electrode injecting electrode (cathode Element 3; see Para. 0061).

l. In so far as claims 29-33 are definite, the examiner notes that all of these method steps recite acts for forming elements that are not actually part of the claimed device. As such, these claims fail to limit the method since they do not recite steps of forming elements that fall into the scope of the claimed structure. The method set forth merely

steps forth steps for elements that the device of claim 1 does not comprise and as such, these steps do not form the device claim.

m. Regarding claim 35, Hayashi in view of Kelley teaches the device of claim 1, which is a display.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-27, 29-33, 35 and 37 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-21 of U.S. Patent No. 7,638,793. Although the conflicting claims are not identical, they are not patentably distinct from each other because while the claims of U.S. Patent No. 7,638,793 recite an n-channel or ambipolar

transistor instead and do not recite a light emitting transistor, the elements which actually comprise the limitations of the claims are identical. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the n-channel or ambipolar transistor claimed in U.S. Patent No. 7,638,793 a light emitting transistor in order to increase functionality and provide light output and because no additional limitations are required for such functionality to be exhibited by the claimed device (as evidenced by the claimed limitations as currently written).

Response to Arguments

12. Applicant's arguments filed 11 May 2010 have been fully considered but they are not persuasive.

13. The Applicant argues that Hayashi does not teach a transistor. The Applicant further argues that the device of Hayashi is connected to separate transistors as shown in Figs. 30 and 31 of Hayashi and that they are not integrated in the manner claimed and, because of this, the device of Hayashi is not a transistor. These arguments are not persuasive. Hayashi does teach a transistor for at least the following reasons. Firstly, Hayashi teaches the elements as set forth by the claim as shown above, as required for a prior art reference to be anticipatory (see above for details). The remainder of the language of the claim is merely a description of what the claimed device is in contact with (or placed between or operated with) and what the claimed device does (see above for further detail). Secondly, it is noted that while the elements must be arranged as required by the claim, this is not an *ipsissimis verbis* test, i.e., identity of terminology is not

required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). Specifically, Hayashi does not need to use the term "transistor" to meet the claim. Nevertheless, the device of Hayashi is a transistor. This is evidenced by the elements that Hayashi teaches and supported by further evidence from Ruzyllo (who set forth an art-recognized definition of "transistor"). The examiner notes that the device of Hayashi is a transistor because it has two electrodes (Elements 3, 3a and 5, 5a) between which current flows, also has a third electrode (Element 4, 4a which controls the level of current that flows between Elements 3, 3a and 5, 5a by applying a voltage to the third electrode which is isolated from the organic semiconductor layer by the insulation layer of Element 2; see Para. 0020-0022; Para. 0063, Lines 13-19; Para. 0076). Ruzyllo evidences that such configurations are transistors since a transistor is a "three-terminal semiconductor device in which input signal (voltage or current depending on the type of transistor) controls output current" (see Page 163, entry for "transistor"). Thirdly, in response to applicant's arguments, the recitation of "transistor" does not have patentable weight to distinguish over the prior art because the recitation occurs in the preamble. A preamble is generally not accorded patentable weight to distinguish over the prior art where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). In the present case, the term "transistor" does not distinguish the claim over the prior art for the reasons already set forth and because the term "transistor" by itself does not provide enough to structurally distinguish the claimed invention from the prior art. The reason is because a "transistor" as is known in the art is a "three-terminal semiconductor

device in which input signal (voltage or current depending on the type of transistor) controls output current" (see Ruzyllo Page 163, entry for "transistor"). Fourthly, the claim as currently written does not limit what is included and excluded from "transistor" sufficiently to distinguish the invention over the prior art.

14. The Applicant argues that claims 16-21 recite structure and further limit the structure of the parent claim. This is not correct. The language chosen by the Applicant in claim 1 does not state that the scope of the claimed device comprises (or includes) the electron injecting electrode and the hole injecting electrode. As currently written claim 1 merely states that the electron and hole injecting electrodes are things that the ambipolar light-emitting transistor is used with. Since the electron injecting electrode and hole injecting electrode are merely what the claimed device is used with, then further descriptions of electron injecting electrode and hole injecting electrode set forth in claims 16-21 merely describe what the claimed device is used with in greater detail and do not further limit the elements that actually comprise the claimed device itself. If the Applicant wishes to properly claim that the electron injection electrode and the hole injection electrode are actually part of the claimed device, the examiner suggests language such as "An ambipolar, light-emitting transistor comprising an organic semiconductive layer, an electron injecting electrode, a hole-injecting electrode, and an organic gate dielectric layer; wherein the organic semiconductive layer is between the electron injecting electrode and the hole injecting electrode and has an electron affinity EAsemicond…".

15. Regarding the Applicant's traversal of the Double Patenting rejection set forth, the Applicant argues that "this rejection is traversed on the basis of the accompanying Terminal Disclaimer" (see Remarks Page 16). This is not persuasive. No Terminal Disclaimer accompanies the filing presently in this case.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW W. SUCH whose telephone number is (571)272-8895. The examiner can normally be reached on Monday - Friday 9AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kiesha Bryant can be reached on (571) 272-1844. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew W. Such/
Primary Examiner, Art Unit 2891